New Jersey Flows

New Jersey Water Resources Research Institute

Volume II, Issue 2 **Fall, 2001**

News from the USGS

Study of land-use effects on water quality completed

By Eric Evenson, U.S. Geological Survey

The quality of water-supply aquifers, especially regarding nitrate, and the health of stream biological communities are two primary water-resource issues in New Jersey and on Long Island, according to a recent report from the U.S. Geological Survey. The water-quality conditions are directly associated with urban/suburban and agricultural land and the chemicals used in these settings. Focusing on streams and aquifers in a study area covering most of New Jersey and Long Island, the USGS gathered and analyzed data from the 1970s through the 1990s as part of its National Water-Quality Assessment (NAWQA) Program.

"There are success stories as well as areas that need further attention," said USGS project manager, Mark Ayers. "For example, pesticides and volatile organic compounds generally are well below Federal and State water-quality guidelines for human health. Concentrations of constituents subject to regulation in the past, such as lead, mercury and organochlorine pesticides, show reductions in lakes sediments (which track chemical inputs over long time periods). Also, stream conditions for fish have improved since the 1970s largely as a result of wastewater-treatment-plant upgrades implemented under provisions of the Clean Water Act."

However, major challenges remain in protecting, and where possible, restoring the aquatic resources in urban streams. These relate to mitigation or control of the amount of impervious surface area, storm runoff, and chemical use, and to maintenance and restoration of forest and wetland areas and stream-habitat quality. Also, land-management practices that reduce the movement of nitrate (and other chemicals) to ground water are likely necessary for some areas.

> ***"concentrations of nitrate in shallow ground water in southern New Jersey ... are among the highest measured so far"***

Analyses of land-use changes since the 1970s revealed an increase of 8% in population and 11% in urban/suburban land area. Not surprisingly, compounds associated with fossil-fuel use and vehicular traffic (PAHs and zinc) increased in lake sediments. Likewise, levels of most urban pesticides, fertilizers, and industrial and fuel-related compounds in streams and aquifers matched the upward trends of urban land use and chemical use. Some constituents (arsenic and radium) are present naturally in ground water in areas where aquifer sediments or formations are known to contain these constituents. Water managers and water utilities are continuing to assess the occurrence and prevalence of mercury, radium, and volatile organic compounds in their respective areas.

About 40 percent of the domestic (household wells) and public drinking-water supplies in the study area are obtained from ground water replenished by precipitation that infiltrates the soil and drains to surficial aquifers. Elevated concentrations of nitrate and the frequent detection of pesticides and volatile organic compounds in water samples from surficial aquifers confirm that the surficial aquifers are vulnerable to chemicals used in urban/suburban and agricultural areas.

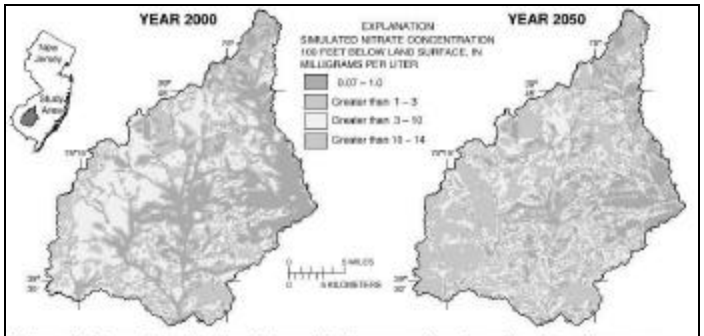

Figure 17. Domestic wells in the Kirkwood-Cohansey aquifer of southern New Jersey are commonly completed at a depth of 90-100 feet below land surface. Simulated nitrate concentrations at this depth in the Glassboro study area for the years 2000 and 2050 indicate that ground water in areas of intensive nitrogen fertilizer use is likely to exceed the drinking-water standard for nitrate of 10 mg/L by 2050. This simulation assumes nitrate inputs remain unchanged from year 2000.

The study also confirms that concentrations of nitrate in shallow ground water (Kirkwood-Cohansey aquifer) underlying intensive agricultural areas in southern New Jersey frequently exceed the drinking-water guideline of 10 mg/L and are among the highest measured so far by NAWQA in 47 other agricultural areas around the nation. In 1995, of the 2,500 square mile Kirkwood-Cohansey aquifer, about 11 percent was mapped as agricultural land, about 14 percent was mapped as urban land, about 43 percent was mapped as forested land, and 32 percent wetlands, water and barren land. Previous studies indicate that concentrations of nitrate in shallow ground water underlying

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The Director's Chair

by Joan G. Ehrenfeld, Ph.D., Director
New Jersey Water Resources Research Institute
Rutgers, The State University of New Jersey

This issue features the results of the extensive study of water quality undertaken by the US Geological Survey under the National Water-Quality Assessment program (NAWQA) throughout New Jersey and Long Island. This research program has been the most far-reaching analysis of surface and ground waters with respect to land use throughout the United States. In 16 study areas, which included 120 agricultural and 35 urban watersheds, the associations of nutrient, pesticide, metal and volatile organic contaminants in ground and surface waters were related to the biotic integrity of streams and the land-use practices. The reports, now being issued by the USGS, give us the best information thus far available to determine how our behavior ultimately affects our water supply. New Jersey was fortunate to be included as one of the primary study units of this effort. We can now use the information to develop programs, through watershed management planning, to reduce negative impacts and restore healthy waters to areas where they are impaired.

National Water Information System On-line

USGS has launched a new website for our nation's water data. The National Water Information System (NWISWEB) can be found at **http://www.usgs.gov/nwis/** and allows users to access several hundred million pieces of archival and real time data. This site can help water managers, users, utilities, emergency managers, scientists, engineers, and environmentalists to evaluate current supplies and plan for the future, forecast floods and droughts, operate reservoirs effectively, evaluate and control water quality, navigate rivers and streams, and assist in safe recreational pastimes.

For additional information about other USGS data types (maps, satellite images, geology or biology data), visit the USGS homepage at: **http://www.usgs.gov**

Water quality study completed

(Continued from page 1)

suburban and agricultural areas on eastern Long Island also frequently exceed the guideline. The use of nitrogen-based fertilizers to support crop production or the use of septic systems, combined with the presence of well-drained and aerated soils in these areas, favor the formation of nitrate and its movement to ground water.

Concentrations of nitrate in shallow ground water were consistently greater than in streams draining in similar settings.

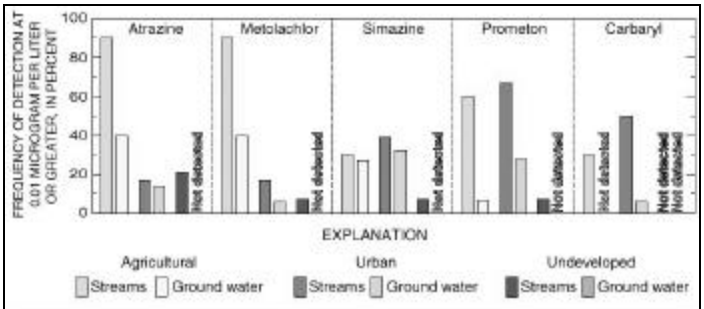

Figure 22. Pesticides are detected more frequently in streams and ground water in agricultural and urban areas than in undeveloped areas.

Concentrations of nitrate in domestic and public-supply wells are lower than the monitoring wells largely because they are deeper in the aquifer than the monitoring wells, are pumped at much higher rates, and have a mixture of land uses in their contributing areas. Studies are currently underway in the NAWQA Program in similar hydrogeologic settings, like the Coastal Plain of the Delmarva Peninsula. Results from these will be of interest for comparative purposes with the findings from the New Jersey and Long Island Coastal Plain.

A computer model of nitrate movement in the surficial aquifer system in southern New Jersey, verified by monitoring data, confirms the critical relation between land use in the recharge area and the concentrations of nitrate in streams and public-supply wells. Model results also indicate that years may pass before reductions in nitrate use will produce substantial decreases in the concentrations of nitrate in streams and ground

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Conference Calls

American Water Resources Association (AWRA) **http://www.awra.org** announces their 2002 Spring Speciality Conference on Coastal Water Resources scheduled for May 13-15, 2002 in New Orleans, Louisiana. Additionally information on the NJ-AWRA/GANJ Fall 2001 Meeting entitled "Geology in the Service of Public Health," a Joint Meeting of the Geological Association of New Jersey and the New Jersey Section-American Water Resources Association will be held on October 26-27, 2001. More information is available at: **http://www.awra.org/state/new_jersey/index.html**.

The Groundwater Foundation will present "Today's Technology Protecting Tomorrow's Groundwater," co-sponsored by US EPA region III, November 14 - 16, 2001, in Pittsburgh, PA. **www.groundwater.org**

Land Trust Alliance Mid-Atlantic Program **http://www.lta.org** presents a seminar on "Fund Raising For Land Trusts" on November 12, 2001 in cooperation with New Jersey Conservation Foundation **www.njconservation.org** and the Watershed Institute **www.thewatershed.org** at Rutgers University, New Brunswick, NJ. Download the full brochure at **http://www.lta.org/training/lct_ma.htm**.

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water. State and local agencies and the agricultural community itself are actively promoting the prudent use of nitrogen fertilizers and other management practices that reduce the movement of nitrate to ground water.

The USGS report, "Water Quality in the Long Island-New Jersey Coastal Drainages, New Jersey and New York, 1996-1998", is available on the World Wide Web as downloadable portable document files (PDF) or in printed form (single copies of the report are at no cost) from Branch of Information Services, P.O. Box 25286, Denver, CO 80225, or by fax request to 303-202-4693. Please specify USGS report C-1201.

Other products of the NAWQA study are available on the Web at **http://nj.usgs.gov/nawqa/factsheets.html**. As the nation's largest water, earth and biological science and civilian mapping agency, the USGS works in cooperation with more than 2000 organizations across the country to provide reliable, impartial, scientific information to resource managers, planners, and other customers. This information is gathered in every state by USGS scientists to minimize the loss of life and property from natural disasters, contribute to sound economic and physical development of the nation's natural resources, and enhance the quality of life by monitoring water, biological, energy, and mineral resources. *****

History and Implementation of the Anderson Water Resources Research Act

Excerpted remarks of Benton J. Stong, Professional Staff Member, U.S. Senate, Interior and Insular Affairs Committee at the Western Resources Conference – July 16, 1964

BACKGROUND

Soon after the 86th Congress convened in 1959, Senator Mike Mansfield of Montana told a conference of Western Democratic Senators ... that water was the greatest resource problem facing not only the West, but also the entire nation. He proposed that the group sponsor an investigation of the nation's water situation and the problems, which would have to be faced through the year 2000.

A Select Committee was named out of the Committees on Interior and Insular Affairs, Public Works, Commerce and Agriculture. Twenty-two hearings were held across the nation. Every agency in the Federal government with a water resource mission was asked to prepare a report in its field. Special studies were also made by other non-governmental water authorities, resulting in the first national supply-demand study by water regions in the nation. A set of 32 studies were published as Committee prints, which became best sellers.

A majority of Committeemen ***did support*** adoption of recommendations for subsequent action, which emphasized cooperation with the states and Federal stimulation of the states to a larger role in planning and management. Five recommendations were approved by the full Committee:

1. Federal and state cooperation in planning for development and management of the nation's river basins by 1970.
2. A more active role by the State in water planning, development and management through a $5 million yearly grand-in-aid program extending for 10 years.
3. A Federal research program on water and water resources
4. A biennial assessment of national water supply-demand outlook for each major water resource region
5. A cooperative Federal/State stepwise effort to encourage flood plain planning, ameliorate economic effects of water shortages in the five water regions confronted with reaching the limit of their supplies by 1980, prepare estimates of the need for storage reservoirs for all purposes in major basins and preservation of the necessary sites, and assure public hearings in the areas involved on all major water projects.

A bill sent to Congress in the name of President Eisenhower to establish a Federal river basin planning commission was revised and submitted as a Kennedy Administration proposal in July 1961. Hearings were held in the Senate on the Senate bill version, and witnesses for several states expressed ***bitter*** opposition to Federal planning. As a result of 2 years of hearing and conferences, the proposed river basin planning commissions became a new concept of Federal/State commissions in which States would participate as autonomous entities and ***share decision-making*** with the Federal government.

THE ANDERSON BILL

From this background, the research bill emerged. In May 1962, Senator Anderson initiated a Committee survey of water resources research in the Federal agencies, land grant colleges, and a sampling of non-land grant colleges, universities, private entities and individuals.

An urgent need for hydro-scientists, and the *desirability of combining research and education* was pinpointed. Responses expressed that water problems vary in relation to the environment and described a need for widely dispersed research centers to permit assistance, even to local agencies and officials concerned with water planning and management. A clear need was identified for a system of communication of information from the research centers to millions of water users who would be increasingly involved in its conservation and wise use as stringency of supply and demand was anticipated to increase.

In Journal of Atomic Scientists, Stephen Dedier, a Russian scientist who chose citizenship in the free world, wrote that the ***essential*** element of the success of democracy is the sharing of technical and scientific knowledge by all citizens, not just an educated elite. His observation underlined one reason for our great successes in the agricultural field, and one of our water resources research needs – a system for ***communication*** of results of research to millions of citizens who manage water on their lands, in their factories, their communities, or their homes, and use or misuse it, waste or conserve it.

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New Jersey's Watersheds

Pine Barrens Stream Research Sponsored by the NJWRRI

By C. M. Epstein, the Richard Stockton College of NJ

The New Jersey Water Resources Research Institute awarded Dr. Claude Epstein of the Richard Stockton College of New Jersey and his student Eric Baumgarten a grant for undergraduate research. Their study involved two topics. First, they undertook a level II Rosgen analysis of the Oswego River, a relatively pristine river in the heart of the New Jersey Pine Barrens. Second, they studied the relationship of peat formation with groundwater-surface water relationships. This study involved intensive fieldwork during the spring and summer of 2000, that included the measurement and surveying of the stream channel and its floodplain and the measurement of peat thickness and water table gradient at the sites surveyed.

Rosgen analysis is a method derived by D.L. Rosgen (1994) to assess "normal" channel morphology for various geomorphologic settings. "Type reaches" (i.e., locations along the stream that represent the "norm") are established where field measurement, surveying and calculations are made. The streams are then divided into 8 basic stream types based on a small number of field parameters. It can be further subdivided into many more subtypes based on additional criteria. Once stream type is established, deviations from the "norm" due to environmental degradation can be recognized quantitatively.

While Rosgen analysis has been used frequently west of the Mississippi River, it has not been applied much in the east and, until very recently, not at all in New Jersey. [The NJWRRI previously sponsored a Rosgen analysis pilot study, by Epstein and another student Christopher Schipper, on Penn's Swamp Stream to assess the suitability of this method to Pine Barrens streams and to calibrate to it local conditions (C.M. Epstein, 1999).]

Fifty-three "type reaches" were established along the Oswego River and its tributaries where measurements were taken and stream type determined. A consistent pattern of stream type pattern was observed. It started in the headwaters with single or multiple channel streams flowing over sand giving way to multiple channel streams flowing over peat giving way to single channel streams flowing over peat then sand and gravel.

Peat thickness and water table gradient at these "type reaches" also showed a consistent pattern. Peat, once established in the floodplain, thickened downstream until it was penetrated by the stream channel. It was then relegated to the floodplain away from the channel. Based on the water table gradient data, the upper reaches of the Oswego River proved to the sites of groundwater recharge rather than, as expected, sites of groundwater discharge. This expectation however was met in the lower reaches.

These analyses proved to be excellent learning experiences. Students brought into the field, braving the dense thorny vegetation of Pine Barrens stream, got to see what it means to take measurements and survey under field conditions. But even more, once the data was collected, students got to determine its meaning. The results of this research have been accepted for publication in the Bulletin of the American Water Resources Association. The researchers are grateful to the NJWRRI not only for the funding but also for the opportunity for undergraduate students to develop into a corps of wetland science field researchers. *****

Rosgen, D.L., 1994. A Classification of Natural Rivers. Catena, Vol.22:169-199.

Epstein, C.M., 1999. Rosgen Analysis of a New Jersey Pineland Stream. Wetland Journal, 11(3): 4-9

Anderson Bill

(Continued from page 3)

A desirable mode was suggested by State Agricultural Experiment Stations disseminating results through information and adult extension education programs.

Title I of the resulting bills was closely modeled on the Hatch Act of 1887, which created the agricultural experiment stations, on the 75th anniversary of that Act. It authorized $75,000, increasing to $100,000 a year, for establishment of a water resources research institute at a land grant college or state university in each state, or other higher educational institution designated by the state legislature, for support of a multi-disciplinary water research center, with dollar-for-dollar matching funds for specific water research projects undertaken by those centers.

Title I of the Anderson bill varied from the Hatch Act in that the water centers were to be institutionwide, to assure participation of all disciplines available in water research. Cooperation of other colleges and universities in the state was encouraged to provide a fully rounded water research program.

The money authorization in Title II was limited to $1 million a year, at the House's insistence, for a 10-year trial period. The language of the final bill, S.2, **put as high a value on basic research as on applied**. The House Committee amended S.2 to use it as a vehicle to direct the President to coordinate the water research programs of the various Federal agencies. The Senate accepted that amendment.

Implementation of the Anderson Act was left in the hands of the Secretary of the Interior, who set up an Office of Water Resources Research (OWWR) to administer the bill as a unit independent of any one of several subordinate bureaus or agencies in the Department of Interior. Each state institute was required to undergo a quite diligent and detailed examination of applications for grants. They also were required to make annual reviews and reports to Congress about the program activities. *(continued in next issue - Current Status)* *****

New Jersey's Weather

New Jersey's Precipitation Regime

By Prof. David A. Robinson, New Jersey State Climatologist
Center for Environmental Prediction, Rutgers University

New Jersey's weather and climate offer something for everyone. In a month's time, one might observe record high and low temperatures being broken, tornadoes touching down, severe thunderstorms passing through and a snowstorm blanketing the region (while rare, all occurred in November 1989). A single year may bring serious drought, an inundating flood, extreme heat, numbing cold, a damaging hurricane and a stinging blizzard (1999 had all but the cold and snow). A relatively cool summer, sunny fall, manageable winter, and mild spring are also enjoyed from time to time.

This weather and climate potpourri is a result of New Jersey's middle latitude location. This geographic positioning results in the State being influenced by wet, dry, hot and cold airstreams, making for four relatively well defined seasons and leading to potential clashes between cold and warmth triggering occasional severe conditions.

Topics for discussion in this piece include identifying the wettest time of the year, New Jersey drought frequency, long-term monthly means, and variability over time.

First, it is important to know how precipitation data is gathered. Since the late 19th century, trained observers at several dozen National Weather Service observing stations across the state have taken daily observations of precipitation, snow and temperature. National Weather Service professionals operate some stations, but ***volunteers*** at Cooperative Observing Stations record most of the data. Manual and electronic gauges are used to measure rain and melted snowfall (which, combined, equal precipitation). Statewide values presented here are calculated as an ***average*** of all of the stations operating at a given time; regional values are for northern and southern counties, with a narrow strip of the coastal counties comprising a separate region.

All data and figures discussed in this article are available from the Office of the New Jersey State Climatologist (ONJSC) at **http://climate.rutgers.edu/stateclim**, specifically **http://climate.rutgers.edu/stateclim/data/index.html**. Included are tables showing monthly and annual precipitation for the state and sub regions from 1895 to present.

Based on over a century of data on file, an excellent climatology of New Jersey's annual precipitation regime is available for scrutiny. Between 1895 and 2000, the average annual precipitation across NJ was 44.80 inches. From year to year, this has varied by as much as plus or minus 35% of the mean, with as little as 29.36 inches in 1965, to as much as 59.98 inches in 1996. On average, there is an equitable distribution of precipitation throughout the year. The wettest month (August: 4.59") is only 1.44" greater than the driest (February: 3.15"). Of course, many months vary considerably from the long-term mean: witness the driest month on record, 0.24" in June 1949, and the wettest, 11.44" in August 1955.

Regionally, the northern division is the wettest, followed by the southern and then coastal divisions. Annual precipitation (1895-2000) averages 46.05" in the north, 44.33" in the south, and 42.04" along the coast. Precipitation in the north is enhanced by atmospheric lifting provided by its elevated terrain. The coast has less rain in the summer, as the stable, cooling influence of the ocean results in fewer drenching thunderstorms.

A visit to the ONJSC website reveals the long-term annual mean is 2.39" less than the 1971-2000 mean of 47.19". This clearly indicates that, in addition to the marked year-to-year variability in precipitation, there are also longer-term variations. In fact, on a decade basis, the last half of the 20th century included the 1st (1971-80), 2nd (1981-90), 3rd (1951-60), 4th (1991-2000) and 10th (1961-1970) wettest decades of the century. Thus, with the exception of the drought-filled 1960s, New Jersey has experienced a *much wetter regime* of late, with approximately ***a 5% increase in precipitation over the past century***. The long-term increase in precipitation is seen most strongly in the northern half of the state. This region experienced an approximate 10% increase over the century, even with the dry decade of the 1960s.

New Jersey has its share of flooding events, be they flash floods or major river floods, as seen in recent years, including the Sparta/Hopatcong event in August 2000 and the Hurricane Floyd flood of September 1999. While human development may contribute to these events, it is *heavy rain, sometimes in combination with a rapidly melting snow pack*, that is the major dictating factor. In contrast, a dearth of reduced winter storminesss, non-existent tropical moisture, and meager thunderstorm rains can lead to protracted periods of dry conditions or drought. The past two decades saw precipitation deficits in 1980/81, 1984/85, 1994/95 and 1998/99. However these extended periods of below average precipitation have not lasted for more than a year. None have come close to approaching the most severe drought of the 20th century (analyses of tree rings suggest perhaps for many centuries) that occurred in the early and middle 1960s, nor had the longevity of several other droughts earlier in the century.

It is impossible to predict whether the wet precipitation regime of four of the past five decades will persist into the early decades of the 21st century, or whether the drier pattern of the first half of the 20th century becomes reestablished. Nor can we determine if the tendency for the reservoir-rich northern part of New Jersey to exhibit a greater increase in precipitation than the remainder of the State will continue. The protracted drought of the 1960s was a seemingly rare situation; so too may be the conditions experienced in recent decades, with extended periods of below average precipitation not lasting more than a year. Continued monitoring and research of New Jersey's precipitation regime is needed to better prepare us for floods, droughts, and any hydrologic changes for the coming century. *****

Institute's Program Saved - Legislative Update

This spring, the struggle in the US Congress to trim the Federal spending, as urged by the Bush administration, threatened to eliminate not only the Water Resources Research Institute program, but also to cut back severely on the research programs of the US Geological Survey Water Resources Division. Fortunately, New Jersey's Representative Bill Pascrell, of the 7th Congressional District, took the initiative to preserve program funding in the House of Representatives. His letter requesting funding protection was signed by 28 other Representatives from districts across the country, and resulted in the restoration of funding in the House appropriation bill for the Dept. of the Interior. A similar letter was sponsored in the Senate, for which Sen. Corzine was a co-signor. As a result of these efforts, the Water Resources Research Institute program will continue to function, and the USGS will be able to continue their work on water quality and toxic substances.

News From NRCS

Rehabilitation of Aging Dams

By Greg Westfall, NRCS

NRCS provides technical and cost share assistance for the Small Watershed Program (PL83-566). Small Watershed Program projects provide flood control, municipal and irrigation water supply, recreation, erosion control, water quality improvement, wetland development and wildlife habitat enhancement on more than 130 million acres across the country. Each year, the Small Watershed Program yields benefits of nearly $1 billion.

Nationally, local communities have constructed more than 10,000 small flood control dams with assistance from the Natural Resources Conservation Service (NRCS) since 1948. Dams are part of the national aging infrastructure which includes highways, bridges and storm sewers. Local Small Watershed projects represent a $14 billion national infrastructure investment.

The majority of the dams were planned and designed for a 50-year life span. As dams age, deterioration increases construction costs. Also, today, many dams exist in a far different setting than when they were originally constructed. Most dams were built in rural areas to protect agricultural land downstream. Over the years, population growth and urban sprawl have occurred both upstream and downstream from the dams, and land use changes have taken place. Many dams do not meet current state dam safety requirements due to dramatic changes in the face of the landscape and the land use of the surrounding area.

Rehabilitation includes extending the life of the dam, addressing deterioration of its components, repairs from catastrophic storms, upgrades needed to meet state dam safety laws and decommissioning (removal of dam).

In 2000, the Small Watershed Rehabilitation Amendments (Section 313, PL106-472) were approved. This legislation provides assistance for rehabilitation of dams constructed under the Small Watershed Program. The legislation authorizes up to $90 million over the next five years. Funding must be appropriated annually through Congress. No funds were appropriated for rehabilitation projects for FY2001.

For further information on rehabilitation for Small Watershed Program structures contact Greg Westfall, NRCS Water Resource Planner at 732-246-1171 X165 or David Lamm, NRCS State Conservation Engineer at 732-246-1171 X142. *****

NATURAL HAZARD WEBSITES

Federal Emergency Management Agency (FEMA)
Used to encourage the spread of emergency management-related education. Updated information on the recent WTC disaster. National Flood Insurance Program, Flood Hazard Mapping info. Also important children's site FEMA for Kids: "Become a Disaster Action Kid: How to be prepared for disasters and how you can prevent disaster damage." Narrated by Herman the Hermit "spokescrab." **http://www.fema.gov**

Neat New Jersey Website: Delaware River Basin Commission (DRBC)
Flood Information website includes protection advice, loss reduction and insurance information, flood information for kids, and the connection between droughts, floods and sprawl. Flood warnings, forecasts, and Advanced Hydrologic Prediction Services can be found here too. **http://www.state.nj.us/drbc/Flood_Website/learn.htm**

Coping With Floods – North Dakota State University Extension
Before and after the flood, financial concerns and assistance. Safety, environmental, structural concerns, and more.
http://www.ag.ndsu.nodak.edu/flood/home.htm

New Jersey's Watersheds

Upper Rockaway River Watershed Association

By Diane Nelson

The Upper Rockaway River Watershed Association, an all-volunteer nonprofit organization incorporated in 1978, protect the rivers and streams in the upper Rockaway River watershed. Officers and members are watershed residents who are deeply concerned about water quality and coordinating land-use planning to protect water resources.

The watershed covers approximately 120 square miles of the New Jersey Highlands, and includes all or portions of 18 municipalities. The lower reach of the upper Rockaway River drains through a picturesque gorge in Boonton and flows into a large reservoir which serves as the sole source of drinking water for Jersey City and other municipalities.

The Association's activities have included water quality monitoring and surveillance along the Rockaway and its tributaries, environmental education for area residents, and promotion of sound land-use planning by local government. Its 1980 petition to the U.S. Environmental Protection Agency resulted in federal designation of the Unconsolidated Quaternary Aquifer that underlies the Rockaway River area as the sole source of drinking water for more than 90,000 persons.

In 1985, with encouraged by New Jersey's Division of Fish, Game and Wildlife, the Association initiated a project to collect data on the water quality and trout supporting capacity of the Upper Rockaway River. Funded through a $15,000 challenge grant from the Dodge Foundation, and contributions from other organizations, the Association contracted with Great Swamp Research Institute to study the Rockaway River from the Longwood Lake Dam to the Jersey City Reservoir at Boonton. This project, which took nearly two years to complete, contains substantial evidence that the river's classification should be upgraded and provided the impetus for portions of the river system to be upgraded to trout maintenance or to trout production status.

In recent years, the Association has partnered with the Friends of the Rockaway River to form a river protection network consisting of river front residents, members of the fishing community, and public and private conservation agencies. The Friends produced a beautifully illustrated and valuable guide for the future health and vitality of the river system entitled *The Rockaway River and its Treasured Resources - Visions and Strategies for their Recovery.*

With support from and in partnership with the New Jersey Green Acres Program, the Association participated in the acquisition of two headwater properties, Buck Mountain in Kinnelon and portions of a steeply sloped area of Pyramid Mountain in Montville which had long been championed for protection by the Farny Highlands Coalition.

Currently, the Association is working to protect the centerpiece of the Farny Highlands, Splitrock Reservoir. Although partially protected under conservation easements purchased by Green Acres, the area is now under intense pressure for active recreational development, consisting of roads and constructed facilities. Splitrock, located in Rockaway Township, is part of the Jersey City water system. The Farny Coalition, under the leadership of former DEP Commissioner Helen Fenske, had designated the Splitrock Reservoir as number one priority for preservation. The area is rich in threatened and endangered species, historical resources and is one of the few remaining areas of pristine waters surrounded by wilderness forests.

The Association believes that the challenge for the conservation community now and in the next decade is to ensure effective stewardship of open space lands and overcome limited understanding that recreational uses of land need to be carefully planned to meet environmental constraints, with some remaining free from human intrusion and disturbance. Without stewardship, we will loose our natural sanctuaries, our pristine water supplies, habitats needed for many plants and animals, and our natural laboratories. *****

Vigilance for our Water Supply

The water community of New Jersey is truly saddened over the tragic, extraordinary events of September 11, 2001. We express sincere sympathy to the families and friends of the victims of this disaster. Now, more than ever, we must be vigilant in our protective efforts of our state's water resources and public water supply.

The former New Jersey Rural Water Association has become the New Jersey Water Association. A new webpage at **www.njwater.org/** includes information on Water Systems Threat Readiness and Response, Infrastructure Protection, and FBI Advisories. A list of individuals who may have information related to the terrorist attacks is provided at **www.njwater.org/FBI.htm**.

The Federal Emergency Management Agency (FEMA) website (**www.fema.gov**) contains recent news on the terrorism events, disaster responses, and related information including available disaster assistance. **FEMA Fact Sheet on Terrorism**: **www.fema.gov/library/terrorf.htm**

CDC Bioterrorism Preparedness and Response information is available at: **http://www.bt.cdc.gov/**

Questions of concern and related websites:

"Was there any contamination of drinking water as a result of the WTC and Pentagon fires and collapses?"
www.epa.gov/epahome/headline092101.htm#contamination
"What about protecting the nation's drinking water?"
www.epa.gov/epahome/headline_092101. htm#water

EPA Fact Sheet on Drinking Water Safety:
http://www.epa.gov/safewater/faq/faq.html

Features

New Jersey Flows

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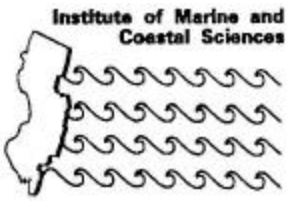

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